

Algebra II Practice A.APR.D.6: Expressions with Negative Exponents

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NAME: \_\_\_\_\_

1. Evaluate (assume  $x \neq 0$  and  $y \neq 0$ ):

$$8x^0 - 5y^0$$

- [A]  $8x - 5y$  [B]  $3xy$  [C]  $3$  [D]  $0$

2. Which expression is equal to  $\frac{1}{5}$ ?

[A]  $5^{-2}$  [B]  $\frac{1}{5^{-1}}$  [C]  $-5^1$

[D]  $-5^2$  [E]  $5^{-1}$

Simplify:

3.  $\frac{z^4}{z^{-4}}$

[A]  $0$  [B]  $z^{-8}$  [C]  $z^{16}$

[D]  $z^{-16}$  [E]  $z^8$

4.  $\frac{x^{-7}}{x^{-8}}$

[A]  $x$  [B]  $\frac{1}{x}$  [C]  $x^{15}$  [D]  $\frac{1}{x^{15}}$

5.  $\frac{36x^5}{12x^{-9}}$

[A]  $3x^4$  [B]  $\frac{3}{x^{14}}$  [C]  $\frac{3}{x^4}$  [D]  $3x^{14}$

6. Write the expression so that it contains only positive exponents.

$$\frac{b^{-3}c^{-7}}{d^{-1}}$$

[A]  $b^3c^7d$  [B]  $\frac{d}{b^3c^7}$

[C]  $-\frac{b^3c^7}{d}$  [D]  $-\frac{d}{b^3c^7}$

Simplify:

7.  $(4x^3y^{-2})^3$

[A]  $\frac{y^6}{64x^9}$

[B]  $\frac{y^6}{12x^3}$

[C]  $\frac{12x^3}{y^6}$

[D]  $\frac{64x^9}{y^6}$

8.  $(3.4)^0$

9.  $x^{-5} \cdot x^{-3}$

10.  $a^{-6}(a^4)(a^{-5})$

11.  $\frac{x^{-7}}{x^{-9}}$

12.  $\frac{c^{-8}d^{-9}}{e^{-2}}$

13.  $\frac{2x^3y^{-3}}{4x^7y^2}$

14.  $\frac{4^{-1}a^2b^{-7}}{4^2(ab)^{-4}}$

15. Simplify. Write the answer with all exponents

positive.  $\left(\frac{4x^{-5}p^5}{y^{-4}}\right)^{-2} \left(\frac{y^3p^4}{x^4}\right)^{-2}$

16. Choose a fraction to use as a value for the variable  $a$ . Find the values of  $a^{-3}$  and  $a^3$ . What is true about  $a^{-3} \cdot a^3$ ?

17. Evaluate

$x^2 - 2y^2 + 2(y-x)(2x^2 + 5xy^4 + 5y^2)^0$  if  $x = 1$  and  $y = 1$ .

18. Copy and complete the table.

$a$	1	2			10	
$2a^{-1}$	2	1	$\frac{2}{3}$	0.25		$\frac{1}{8}$

19. Solve:  $2(x - x^0 + 3) = 2(2x - 1)$

20. Compare the quantities in Column A and Column B.

Column AColumn Bthe value of  $a^{-2}$ the value of  $-a^2$ 

- [A] The quantity in Column A is greater.                      [B] The quantity in Column B is greater.  
 [C] The quantities are equal.  
 [D] The relationship cannot be determined from the information given.

21. Compare the quantities in Column A and Column B.

Column AColumn Bthe exponent of  $z$  whenthe exponent of  $a$  when $3z^4 \cdot z^7 \cdot z^{-3}$  is simplified $5a^{-4} \cdot a^7 \cdot a^5$  is simplified

- [A] The quantity in Column A is greater.                      [B] The quantity in Column B is greater.  
 [C] The quantities are equal.  
 [D] The relationship cannot be determined from the information given.

22. Compare the quantities in Column A and Column B.

Column AColumn Bthe exponent of  $x$  whenthe exponent of  $m$  when $\frac{x^7}{x^2}$  is simplified $\frac{m^6}{m^{-3}}$  is simplified

- [A] The quantity in Column A is greater.                      [B] The quantity in Column B is greater.  
 [C] The quantities are equal.  
 [D] The relationship cannot be determined from the information given.

23. Compare the quantities in Column A and Column B.

Column AColumn Bthe exponent of  $z$  whenthe exponent of  $z$  when $(z^{-2})^{14}$  is simplified $(z^4)^{-7}$  is simplified

- [A] The quantity in Column A is greater.                      [B] The quantity in Column B is greater.  
 [C] The quantities are equal.  
 [D] The relationship cannot be determined from the information given.

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[1] C

[19] 3

[2] E

[20] D

[3] E

[21] C

[4] A

[22] B

[5] D

[23] C

[6] B

[7] D

[8] 1

[9]  $\frac{1}{x^8}$

[10]  $\frac{1}{a^7}$

[11]  $x^2$

[12]  $\frac{e^2}{c^8d^9}$

[13]  $\frac{1}{2x^4y^5}$

[14]  $\frac{a^6}{64b^3}$

[15]  $\frac{x^{18}}{16y^{14}p^{18}}$

Answers may vary. Sample: Let  $a = \frac{3}{4}$ . Then

$$\left(\frac{3}{4}\right)^3 = \frac{27}{64} \text{ and } \left(\frac{3}{4}\right)^{-3} = \left(\frac{4}{3}\right)^3 = \frac{64}{27}. \text{ So}$$

[16]  $a^{-3} \cdot a^3 = \frac{27}{64} \cdot \frac{64}{27} = 1.$

[17] -1

[18] 

$a$	1	2	3	8	10	16
$2a^{-1}$	2	1	$\frac{2}{3}$	0.25	$\frac{1}{5}$	$\frac{1}{8}$